



Project Title :- Title: Set Up AWS Backup Plan for EC2 and RDS

1. Objectives

The primary objective of this project is to deploy and secure a sample database application on AWS using:

- EC2 instance (compute)
 - Amazon RDS (database)
 - AWS Backup for backup and recovery
- The goal is to implement a reliable backup and restore strategy, demonstrate data availability, and ensure data integrity.

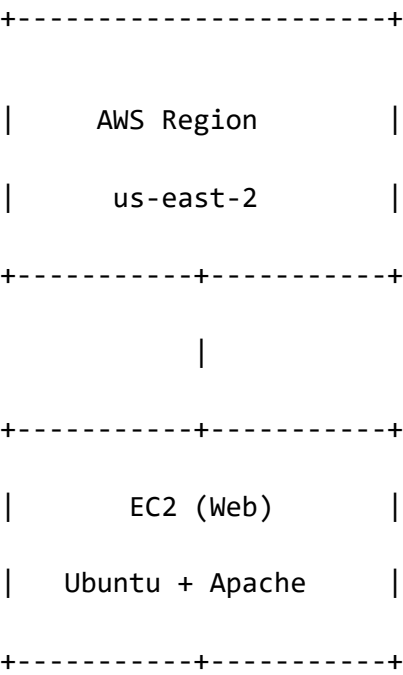
2. Introduction

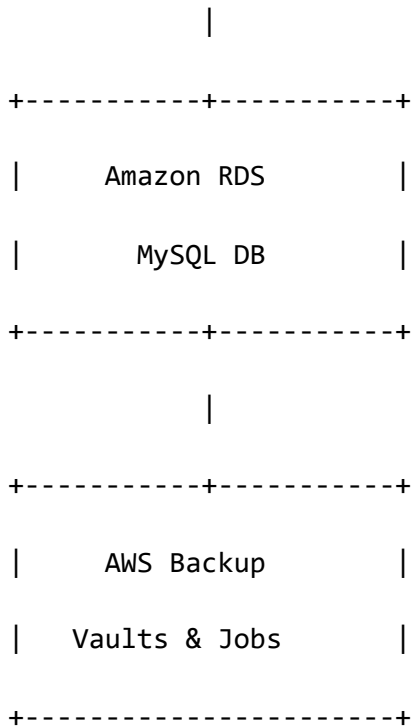
Cloud-based deployments are now the standard for modern applications, providing scalability, security, and cost efficiency. In this project, we built a simple database-driven application using AWS infrastructure services. We configured backups, tested data recovery, and demonstrated the entire workflow of provisioning, securing, and backing up cloud resources.

3. Technology Stack

Component	Technology / Service
Compute	Amazon EC2 (Ubuntu)
Database	Amazon RDS (MySQL 8.0)
Backup & Restore	AWS Backup
Web Server	Apache2
Programming / CLI	Linux shell, MySQL client
OS	Ubuntu 22.04 LTS (on EC2)
Region	us-east-2 (Ohio)

4. System Structure Diagram

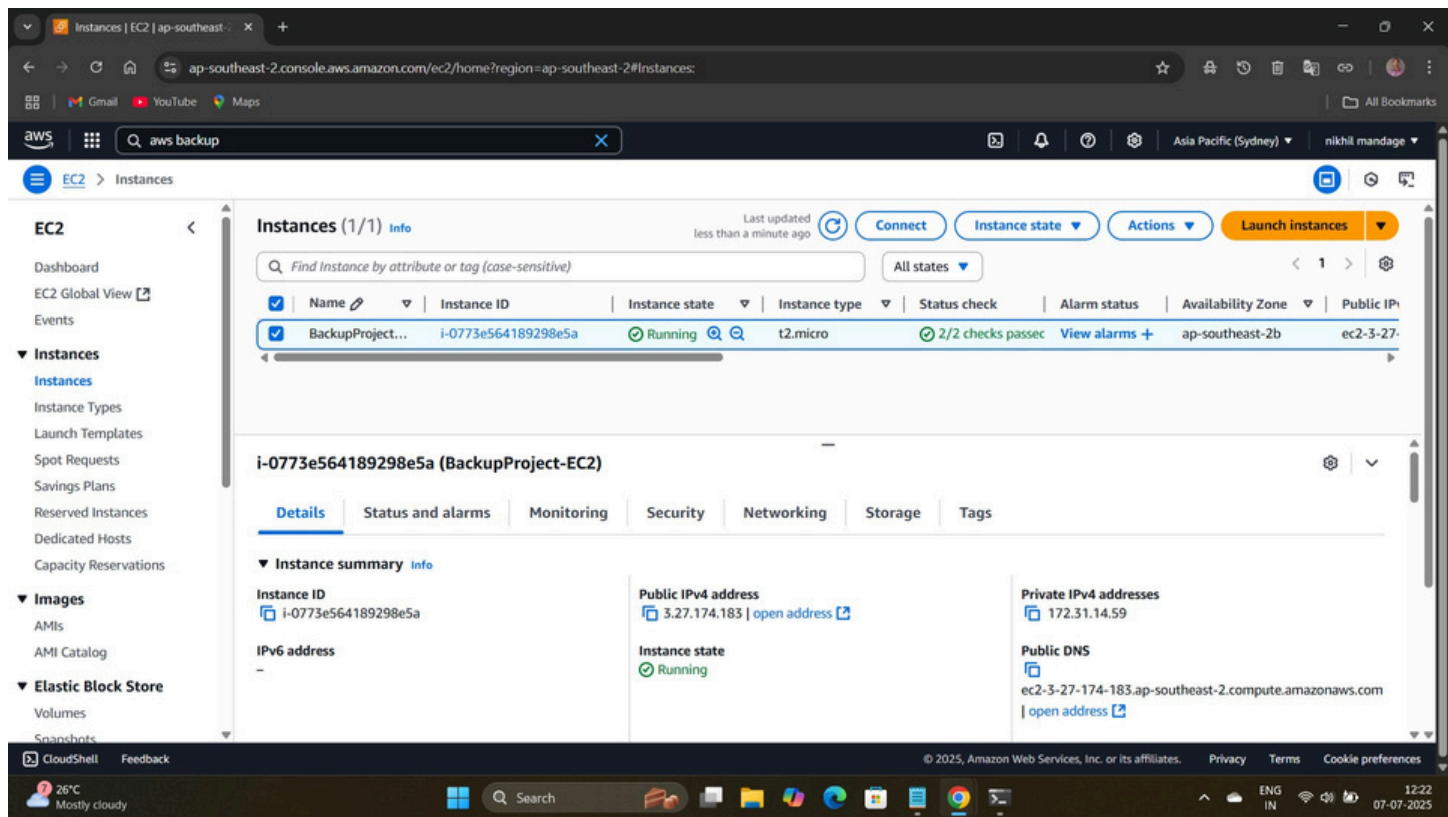




5. Implementation Steps

Step 1: Launch EC2 instance

- Created a t2.micro EC2 instance in us-east-2a



- Configured security groups to allow SSH (port 22) and HTTP (port 80)

Step 2: Set up Apache web server

```
sudo apt updatesudo apt install apache2 -y
```

```
ubuntu@ip-172-31-10-130: ~
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\manda> cd .\Downloads\
PS C:\Users\manda\Downloads> ssh -i .\pro2.pem ubuntu@3.148.208.56
The authenticity of host '3.148.208.56 (3.148.208.56)' can't be established.
ED25519 key fingerprint is SHA256:GX7w5xSVvUHQPCgk0rLztHDDHvGg2Uva8ZGNTGFCMNE.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '3.148.208.56' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1029-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Wed Jul 16 06:32:08 UTC 2025

System load:  0.12      Processes:      105
Usage of /:   25.3% of 6.71GB   Users logged in:  0
Memory usage: 20%      IPv4 address for enx0: 172.31.10.130
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-10-130:~$ sudo apt update && sudo apt upgrade -y
Hit:1 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-2.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
```

```
ubuntu@ip-172-31-14-59: ~
Diagnostics:
The currently running kernel version is not the expected kernel
version 6.8.0-1031-aws.

Restarting the system to load the new kernel will not be handled
automatically, so you should consider rebooting.

Restarting services...

Service restarts being deferred:
systemctl restart networkd-dispatcher.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
ubuntu @ session #1: sshd[1038]
ubuntu @ user manager service: systemd[1044]

No VM guests are running outdated hypervisor (qemu) binaries on this
host.
ubuntu@ip-172-31-14-59:~$ sudo systemctl enable apache2
sudo systemctl start apache2
Synchronizing state of apache2.service with SysV service script with /
usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable apache2
ubuntu@ip-172-31-14-59:~$ sudo systemctl enable apache2
Synchronizing state of apache2.service with SysV service script with /
usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable apache2
ubuntu@ip-172-31-14-59:~$ sudo systemctl start apache2
ubuntu@ip-172-31-14-59:~$ sudo nano index.html
ubuntu@ip-172-31-14-59:~$ echo "<html><h1>AWS Backup Test Page</h1><p>
EC2 backup test data</p></html>" | sudo tee /var/www/html/index.html
<html><h1>AWS Backup Test Page</h1><p>EC2 backup test data</p></html>
ubuntu@ip-172-31-14-59:~$
```

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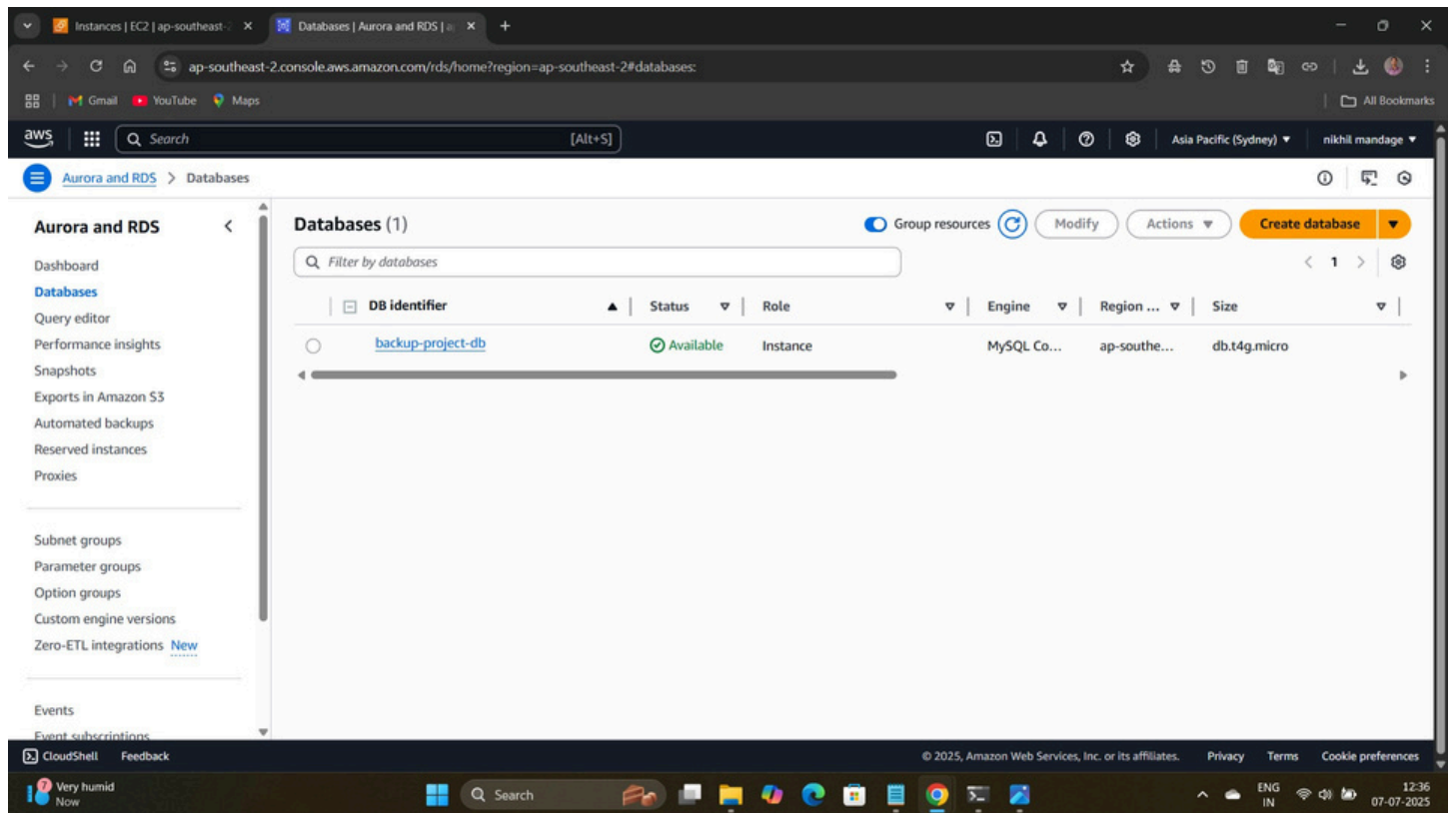
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AWS Backup Test Page

EC2 backup test data

Step 3: Create Amazon RDS instance

- Launched MySQL database instance (db.t4g.micro) named backup-project-db



- Connected to it from EC2 via MySQL client

```

ubuntu@ip-172-31-14-59: ~$ mysql -h backup-project-db.c1c6oq8ge4m1.ap-southeast-2.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 43
Server version: 8.0.41 Source distribution

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> clear
mysql> CREATE DATABASE testdb;
Query OK, 1 row affected (0.02 sec)

mysql> USE testdb;
Database changed
mysql> CREATE TABLE sample_table (id INT AUTO_INCREMENT PRIMARY KEY, name VARCHAR(50));
Query OK, 0 rows affected (0.05 sec)

mysql> INSERT INTO sample_table (name) VALUES ('Backup Test 1'), ('Backup Test 2');
Query OK, 2 rows affected (0.01 sec)
Records: 2  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM sample_table;
+----+-----+
| id | name |
+----+-----+
| 1  | Backup Test 1 |
| 2  | Backup Test 2 |
+----+-----+
2 rows in set (0.00 sec)

mysql> show tables
->
+-----+
| Tables_in_testdb |
+-----+
| sample_table |
+-----+
1 row in set (0.35 sec)

```

-

Step 4: Create and populate database

```

CREATE DATABASE testdb;USE testdb;CREATE TABLE sample_table ( id INT AUTO_INCREMENT
PRIMARY KEY, name VARCHAR(50));INSERT INTO sample_table (name) VALUES ('Backup Test
1'), ('Backup Test 2');SELECT * FROM sample_table;

```

```
ubuntu@ip-172-31-14-59: ~  
Query OK, 0 rows affected (0.05 sec)  
  
mysql> INSERT INTO sample_table (name) VALUES ('Backup Test 1'), ('Backup Test 2');  
Query OK, 2 rows affected (0.01 sec)  
Records: 2 Duplicates: 0 Warnings: 0  
  
mysql> SELECT * FROM sample_table;  
+-----+-----+  
| id | name |  
+-----+-----+  
| 1 | Backup Test 1 |  
| 2 | Backup Test 2 |  
+-----+-----+  
2 rows in set (0.00 sec)  
  
mysql> show tables  
-> ;  
+-----+  
| Tables_in_testdb |  
+-----+  
| sample_table |  
+-----+  
1 row in set (0.35 sec)  
  
mysql> CREATE DATABASE testdb;  
ERROR 1007 (HY000): Can't create database 'testdb'; database exists  
mysql> exit;  
Bye  
ubuntu@ip-172-31-14-59:~$  
ubuntu@ip-172-31-14-59:~$  
ubuntu@ip-172-31-14-59:~$  
ubuntu@ip-172-31-14-59:~$ history  
1 sudo apt install mysql-client -y  
2 sudo apt install mysql-server -y  
3 clear  
4 sudo systemctl enable apache2  
5 sudo systemctl start apache2  
6 sudo apt install mysql-server -y  
7 mysql -h backup-project-db.c1c6oq8ge4w1.ap-southeast-2.rds.amazonaws.com -u admin -p  
8 history  
ubuntu@ip-172-31-14-59:~$ |
```

Step 5: Configure AWS Backup

- Created backup vaults

The screenshot shows the AWS Backup console interface. On the left, there is a navigation menu with sections for 'My account', 'External resources', and 'My organization'. The main content area is titled 'AWS Backup' and includes a 'Create backup vault' button. Below this, there are tabs for 'Vaults created by this account', 'Vaults shared through RAM', and 'Vaults accessible through Multi-party approval'. The 'Vaults created by this account' tab is selected, showing a table of three vaults: 'BackupProjectVault', 'Default', and 'my-backup-vault'. Each vault entry includes its name, type (Backup), vault lock status (locked), recovery points count, and KMS encryption key ID. The 'my-backup-vault' has 1 recovery point. The bottom of the screen shows a Windows taskbar with various application icons and system status information.

Vault name	Vault type	Vault lock status	Recovery points	KMS encryption key ID
BackupProjectVault	Backup	Locked	2	cc76a82a-c90d-416a-aa6f-7ecbc431a0e7
Default	Backup	Locked	0	cc76a82a-c90d-416a-aa6f-7ecbc431a0e7
my-backup-vault	Backup	Locked	1	cc76a82a-c90d-416a-aa6f-7ecbc431a0e7

- Defined backup plans targeting EC2 and RDS

Backup plans facilitate repeated backups of data.

Backup plans
Back up data on a repeat basis by creating a backup plan. Backup plans can be customized to ensure specific resources are backed up according to an optimized schedule. [Learn more about backup plans.](#)

[Create backup plan](#)

Recovery points
Backups created by backup plans are called Recovery Points, and they can be viewed in the backup vaults specified by each plan. [Learn more about backup vaults.](#)

[View backup vaults](#)

Compliance monitoring
Backup plans can be monitored for compliance via Backup Audit Manager. [Set up compliance monitoring with frameworks.](#)

[View compliance reports](#)

Backup plans (2) [Info](#)

Backup plans define your backup requirements, including backup schedules, backup retention rules and lifecycle rules.

[Create on-demand backup](#) [Create backup plan](#)

Find backup plan by name

Filter tag key: Any tag key Filter tag value: Any tag v...

Backup plan name	Last runtime	Last modified
daily-ec2-rds-backup	July 7, 2025, 06:46:59 (UTC+05:30)	July 4, 2025, 13:19:42 (UTC+05:30)
BackupProjectPlan	-	July 7, 2025, 11:53:43 (UTC+05:30)

- Ran backup jobs successfully (as seen in AWS Backup console)

Jobs
In jobs, you can monitor the status and other details of backup, restore, and copy activity.

[Backup jobs](#) [Restore jobs](#) [Copy jobs](#)

Backup jobs (2) [Info](#)

Records of your scheduled or on-demand backups.

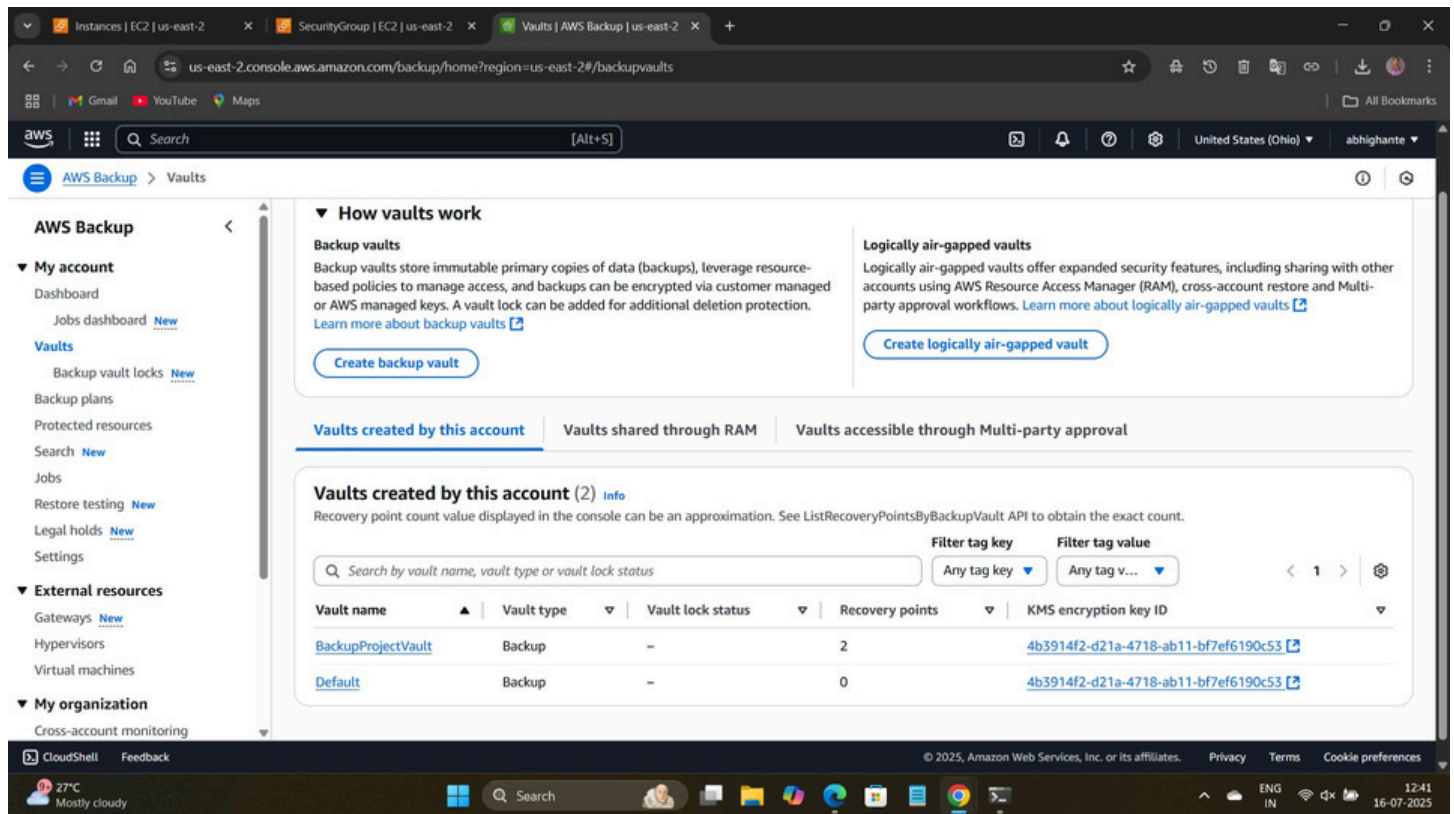
[Stop backup job](#) [Create report](#) [Last 24 hours](#)

Filter backup jobs by job ID, status, resource ID, resource type or message category

Backup job ID	Status	Resource name	Message category	Resource ID	Resource type
3D8EE5E7-0A79-3AA5-EF1E-C3FCFF3A1C22	Completed	backup-project-db	Success	backup-project-db	RDS
73351439-2504-7513-F9FC-897D8FD00386	Completed	BackupProject-EC2	Success	instance/i-0773e564189298e5a	EC2

Step 6: Verify backups

- Verified recovery points created in backup vaults



- Tested restore functionality

6. Results

- EC2 instance (i-052b662c771a8382d) is running and reachable (3.148.208.56)
- RDS instance backup-project-db is live, running MySQL 8.0, and contains test data
- AWS Backup vaults hold recovery points for both EC2 and RDS resources
- Backup jobs completed successfully with status Success

7. Conclusion

This project successfully demonstrates deploying a database application on AWS, connecting it securely to an EC2 instance, and implementing automated backup strategies using AWS Backup. The workflow ensures data resilience, supports disaster recovery, and showcases practical cloud infrastructure management.

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<https://github.com/abhighante37/AWSBackupSetup>

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